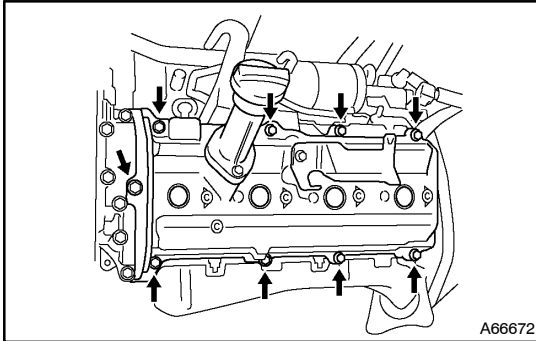


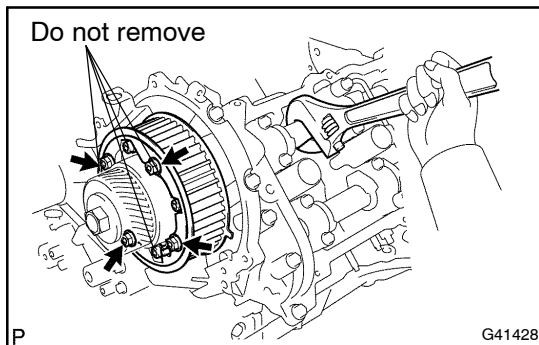
REPLACEMENT

1. REMOVE TIMING BELT (SEE PAGE 14-305)
2. REMOVE IGNITION COIL ASSY
 - (a) Disconnect the 4 ignition coil connectors.
 - (b) Remove the 4 bolts and 4 ignition coils.



3. REMOVE CYLINDER HEAD COVER

- (a) Remove the 9 bolts, 9 seal washers, cylinder head cover and gasket. Remove the cylinder head cover.



4. REMOVE CAMSHAFT TIMING PULLEY SUB-ASSY LH

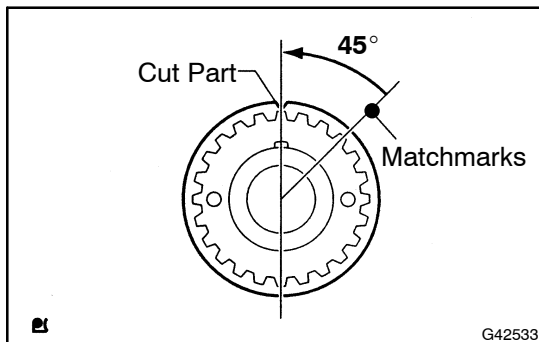
- (a) Hold the camshaft with a wrench, and remove the 4 bolts and timing pulley.

NOTICE:

Do not remove the 4 bolts shown in the illustration. If any of them are loosened or removed, the backlash of the gear in the timing tube will go out of adjustment. In this case, replace the timing tube assembly with a new one.

5. REMOVE CAMSHAFT POSITION SENSOR

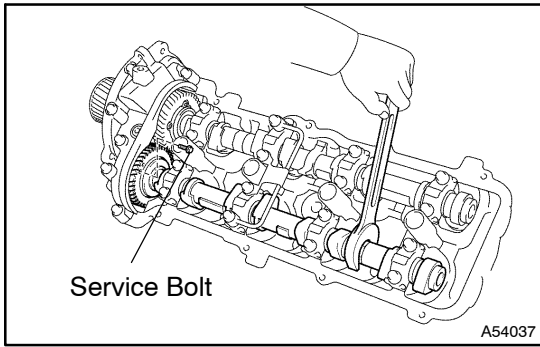
- (a) Remove the bolt, stud bolt and camshaft position sensor.



6. REMOVE CAMSHAFT

NOTICE:

- As the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head which receives the shaft thrust may crack or be damaged. To avoid this, the following steps should be carried out.
- Having the crankshaft pulley at a wrong angle can cause the piston head and valve head to come into contact with each other when removing the camshaft. Always set the crankshaft pulley at the correct angle as shown in the illustration.



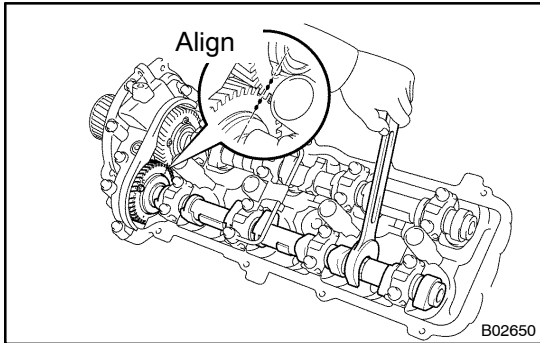
- (a) Bring the service bolt hole of the sub-gear upward by turning the hexagonal portion of the exhaust camshaft with a wrench.
- (b) Secure the sub-gear to the main gear with a service bolt.

Recommended service bolt:

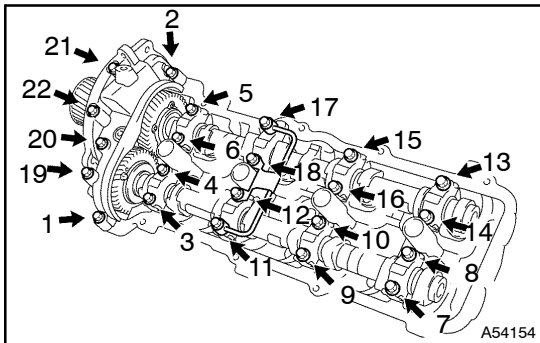
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 to 20 mm

HINT:

When removing the camshafts, make sure that the torsional spring force of the sub-gear has been eliminated by the above operation.



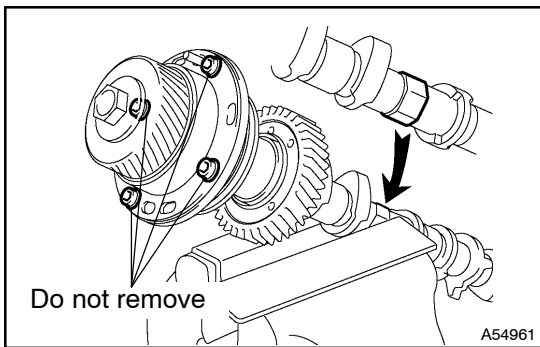
- (c) Align the timing marks (2-dot marks) of the camshaft drive and driven gears by turning the hexagonal portion of the exhaust camshaft with a wrench.



- (d) Uniformly loosen and remove the 22 bearing cap bolts in several steps, in the order shown in the illustration.
- (e) Remove the oil feed pipe, 9 bearing caps, camshaft housing plug, oil control valve filter, and camshafts.

HINT:

Arrange the bearing caps in correct order.

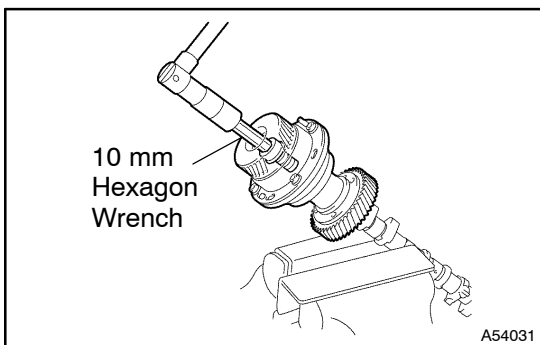


- (f) Mount the hexagonal portion of the camshaft in a vise.

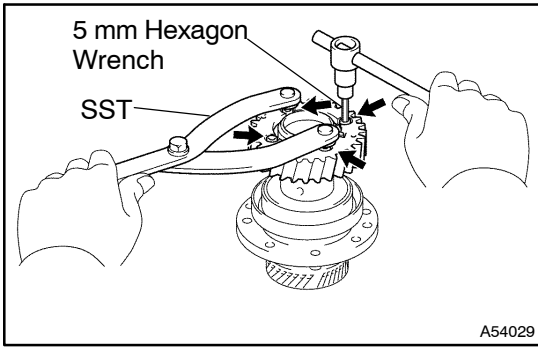
NOTICE:

- Be careful not to damage the camshaft.
- Do not remove the 4 bolts shown in the illustration. If any of them are loosened or removed, the backlash of the gear in the timing tube will go out of adjustment. In this case, replace the timing tube assembly with a new one.

- (g) Remove the screw plug and seal washer.

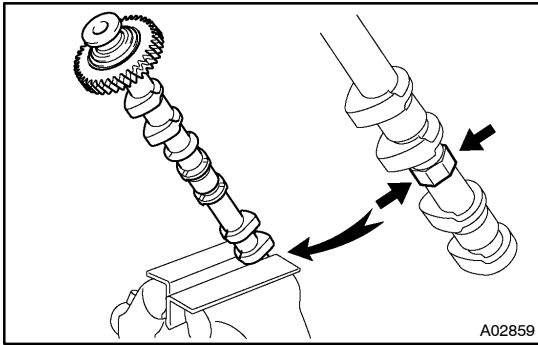


- (h) Using a 10 mm hexagon wrench, remove the bolt.
- (i) Pull out the timing tube and drive gear assembly from the camshaft.



- (j) Using SST and a 5 mm hexagon wrench, remove the 4 bolts, drive gear and oil seal.
SST 09960-10010 (09962-01000, 09963-00500)

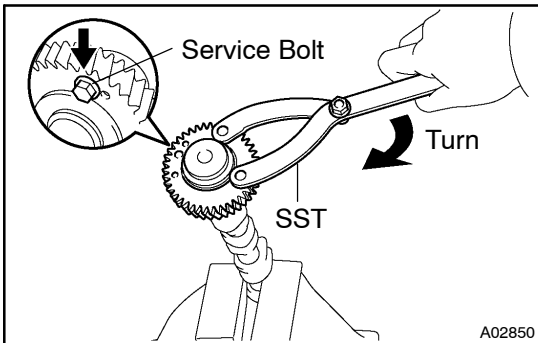
NOTICE:
Be careful not to damage the timing tube.



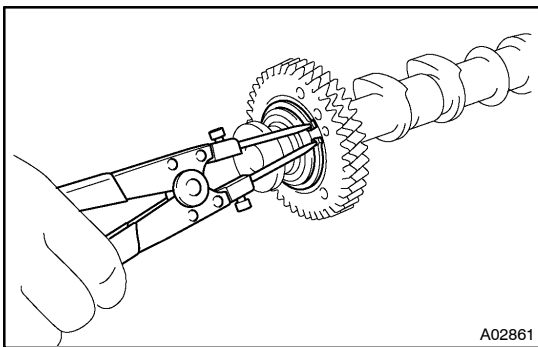
7. REMOVE CAMSHAFT SUB GEAR

- (a) Mount the hexagonal portion of the camshaft in a vise.

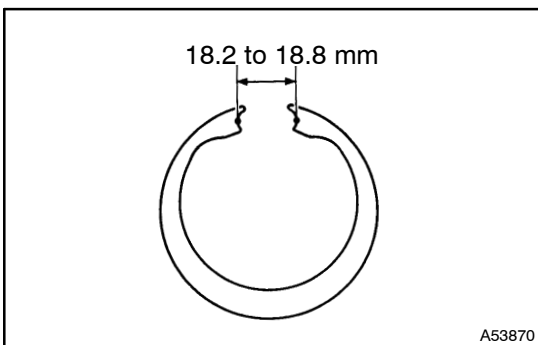
NOTICE:
Be careful not to damage the camshaft.



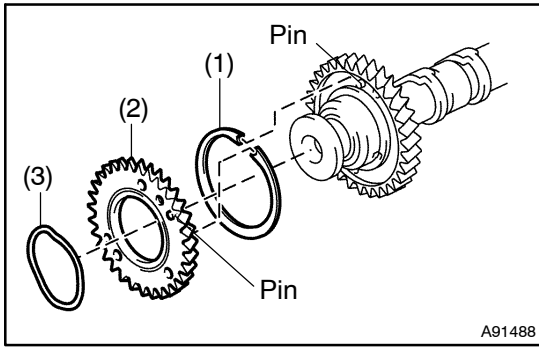
- (b) Using SST, turn the sub gear clockwise and remove the service bolt.
SST 09960-10010 (09962-01000, 09963-00500)



- (c) Using snap ring pliers, remove the snap ring.
 - (d) Remove the wave washer, sub gear and gear spring.
- HINT:**
Arrange the camshaft sub gears and gear spring (RH and LH sides).



- (e) Using vernier calipers, measure the gap distance of the gear spring.
Gap distance: 18.2 to 18.8 mm (0.717 to 0.740 in.)
If the gap distance is not as specified, replace the gear spring.

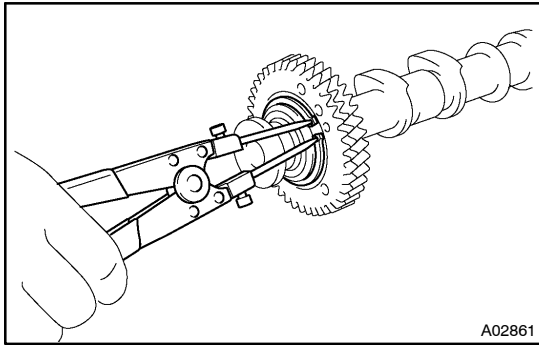


8. INSTALL CAMSHAFT SUB GEAR

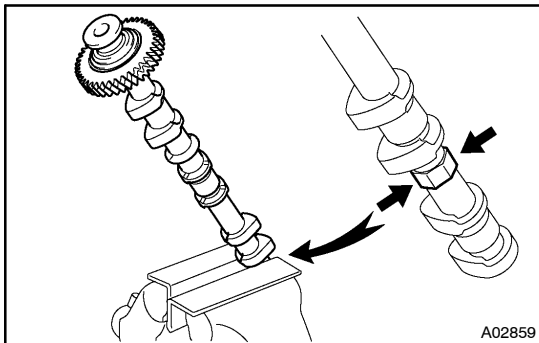
- (a) Install the gear spring (1), sub gear (2) and wave washer (3).

HINT:

Attach the pins on the gears to the gear spring ends.



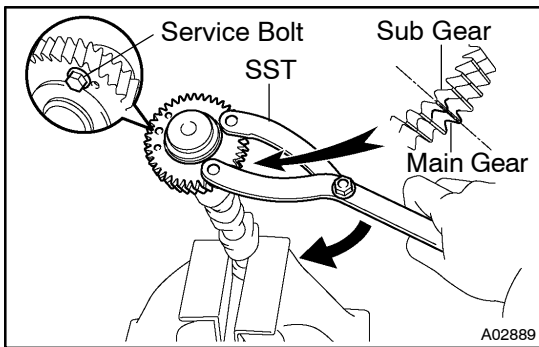
- (b) Using snap ring pliers, install the snap ring.



- (c) Mount the hexagonal portion of the camshaft in a vise.

NOTICE:

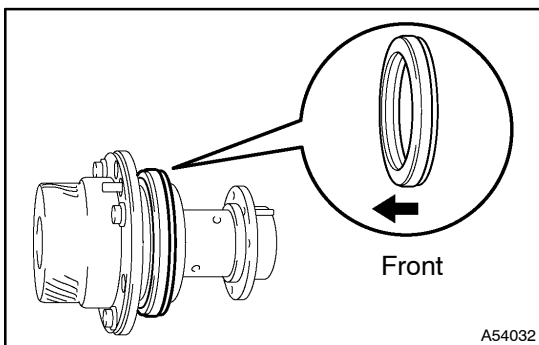
Be careful not to damage the camshaft.



- (d) Using SST, align the holes of the driven main gear and sub gear by turning the sub gear clockwise, and temporarily install a service bolt.

- (e) Align the gear teeth of the driven main gear and sub gear, and tighten the service bolt.

SST 09960-10010 (09962-01000, 09963-00500)

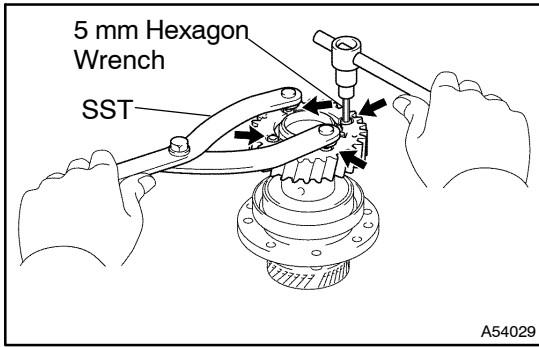


9. INSTALL CAMSHAFT TIMING TUBE ASSY

- (a) Insert a new oil seal into the camshaft timing tube until it reaches the stopper.

NOTICE:

- Be careful of the installation direction.
- Do not turn over the oil seal lip.



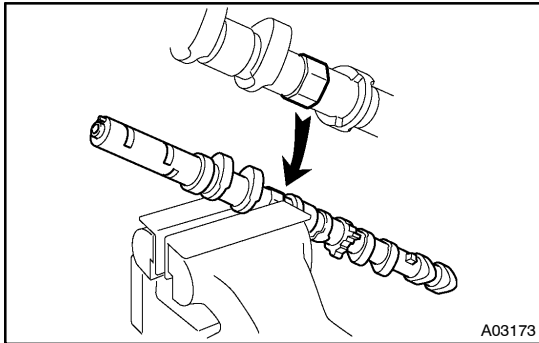
(b) Align the timing tube knock pin with the knock pin groove of the drive gear, and temporarily install the drive gear with the 4 bolts.

(c) Using SST and a 5 mm hexagon wrench, uniformly tighten the 4 bolts in several steps.

Torque: 7.5 N·m (76 kgf·cm, 66 in·lbf)

NOTICE:

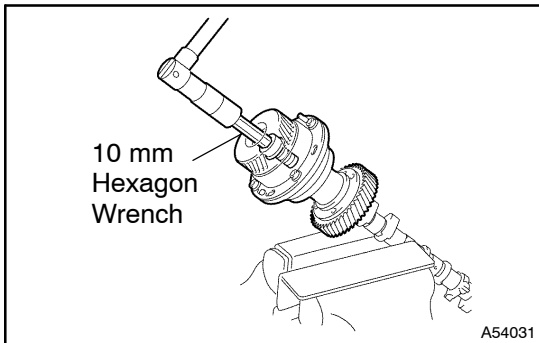
Be careful not to damage the timing tube.



(d) Mount the hexagonal portion of the camshaft in a vise.

NOTICE:

Be careful not to damage the camshaft.



(e) Align the camshaft knock pin with the knock pin groove of the timing tube, and push the timing tube by hand until it touches the bottom.

(f) Using a 10 mm hexagon wrench, install the bolt.

Torque: 78 N·m (795 kgf·cm, 58 ft·lbf)

(g) Install the seal washer and screw plug.

Torque: 15 N·m (152 kgf·cm, 11 ft·lbf)

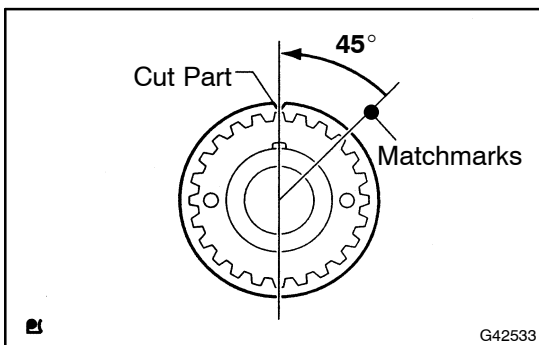
SST 09960-10010 (09962-01000, 09963-00500)

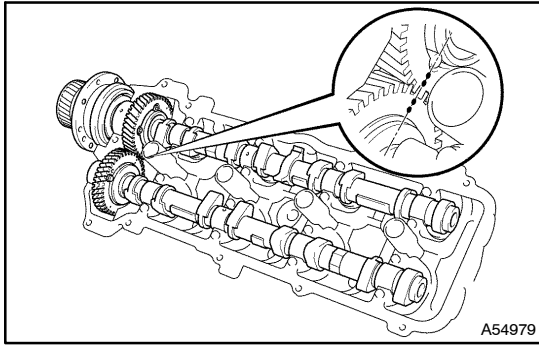
10. REMOVE SEMICIRCULAR PLUG

11. INSTALL CAMSHAFT

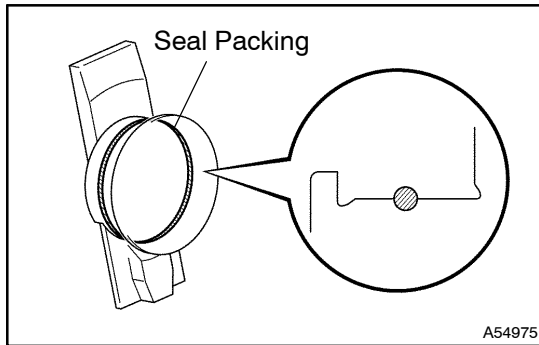
NOTICE:

- As the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head which receives the shaft thrust may crack or be damaged. To avoid this, the following steps should be carried out.
- Having the crankshaft pulley at a wrong angle can cause the piston head and valve head to come into contact with each other when removing the camshaft. Always set the crankshaft pulley at the correct angle as shown in the illustration.

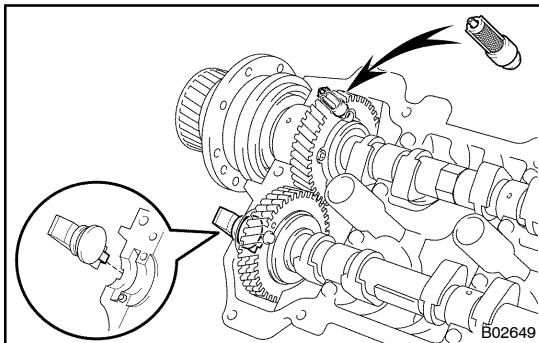




- (a) Apply MP grease to the thrust portions of the camshafts.
 (b) Align the timing marks (2-dot marks) of the camshaft drive and driven main gears, and place the 2 camshafts.



- (c) Apply seal packing to the camshaft housing plug.
 • Remove the old packing (FIPG) material.
 • Apply seal packing to the housing plug.
Seal packing: Part No. 08826-00080 or equivalent



- (d) Install the camshaft housing plug and oil control valve filter to the cylinder head as shown in the illustration.

NOTICE:

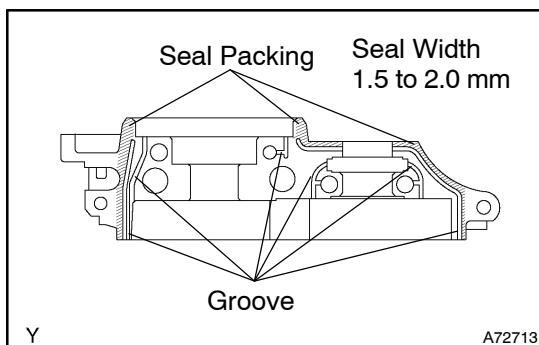
Be careful of the installation direction.

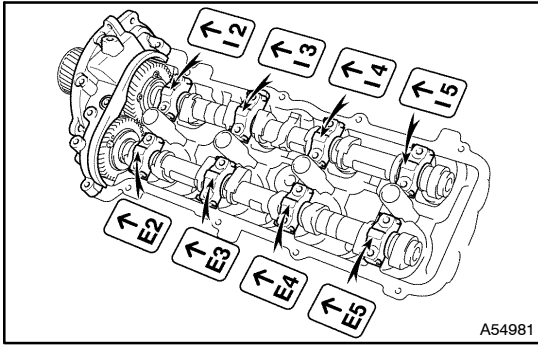
- (e) Apply seal packing to the front bearing cap.
 • Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the bearing cap and cylinder head. Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and groove.
 Thoroughly clean all components to remove all the loose material.
 Using a non-residue solvent, clean both sealing surfaces.
 • Apply seal packing to the bearing cap as shown in the illustration.
 Use a nozzle that has been cut to 1.5 to 2.0 mm (0.059 to 0.079 in.) opening.
 Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
 Immediately remove the nozzle from the tube and reinstall the cap.

Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

Do not apply seal packing to the front bearing cap grooves.



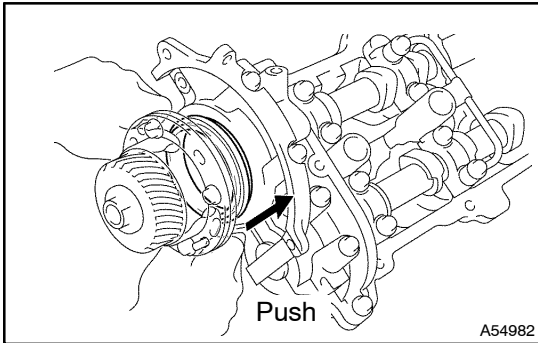


(f) Install the front bearing cap.

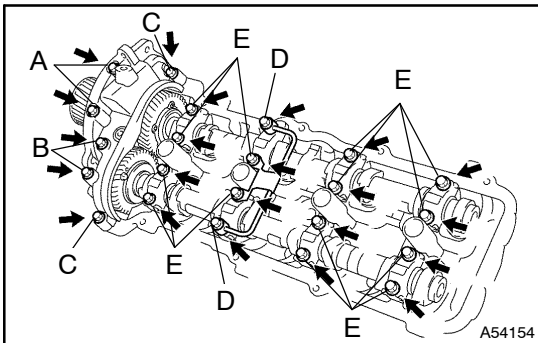
HINT:

The thrust position of the camshaft will be determined after installing the front bearing cap.

(g) Install the other bearing cap in the order shown with the arrow mark facing forward.



(h) Push in the camshaft setting oil seal.



(i) Install a new seal washer to the bearing cap bolt (A and B).

(j) Apply a light coat of engine oil to the threads and under the heads of the bearing cap bolts (D and E).

(k) Install the camshafts of the LH bank.

NOTICE:

Do not apply engine oil under the heads of the bearing cap bolts (A), (B) and (C).

HINT:

Each bolt length is as follows:

94 mm (3.70 in.) for A with seal washer

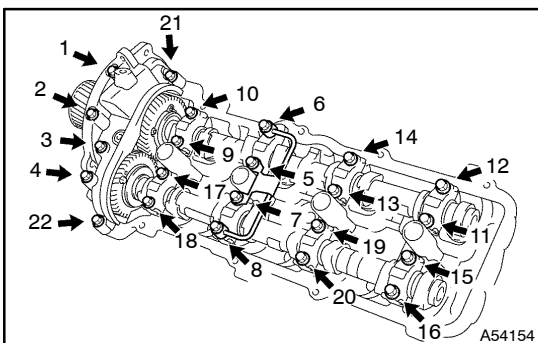
72 mm (2.83 in.) for B with seal washer

25 mm (0.98 in.) for C

55 mm (2.17 in.) for D

40 mm (1.57 in.) for E

(l) Install the oil feed pipe and the 22 bearing cap bolts as shown in the illustration.

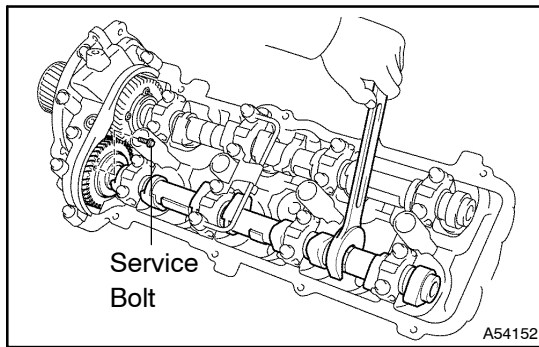


(m) Uniformly tighten the 22 bearing cap bolts in several steps, in the order shown in the illustration.

Torque:

7.5 N·m (76 kgf·cm, 66 in·lbf) for bolt C

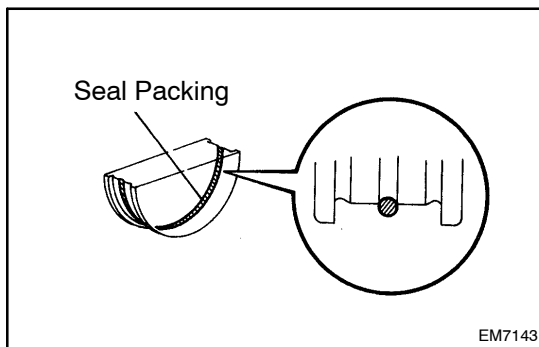
16 N·m (163 kgf·cm, 12 ft·lbf) for others



- (n) Bring the service bolt installed in the driven sub-gear upward by turning the hexagonal portion of the camshaft with a wrench.
- (o) Remove the service bolt.

12. INSPECT VALVE CLEARANCE (SEE PAGE 14-196)

- (a) Turn the camshaft and position the cam lobe upward, and check and adjust the valve clearance.

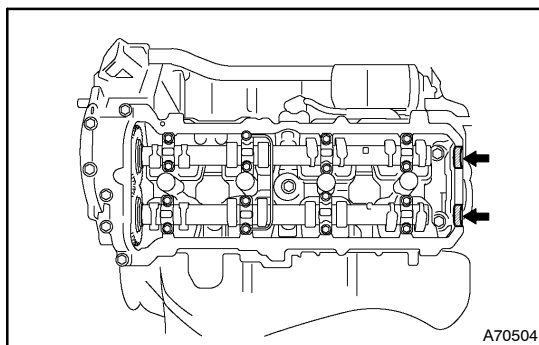


13. INSTALL SEMICIRCULAR PLUG

- (a) Remove any old packing (FIPG) material.
- (b) Apply seal packing to the semicircular plug grooves.

Seal packing:

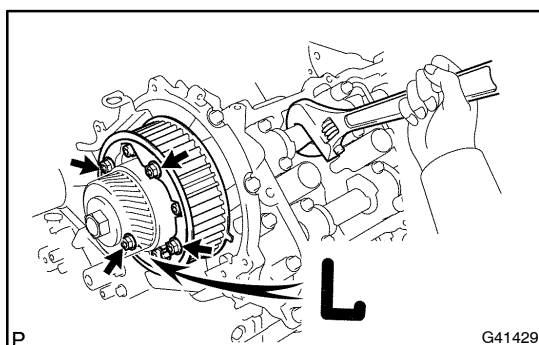
Part No. 08826-00080 or equivalent



- (c) Install the 4 semicircular plugs to the cylinder heads.

14. INSTALL CAMSHAFT POSITION SENSOR

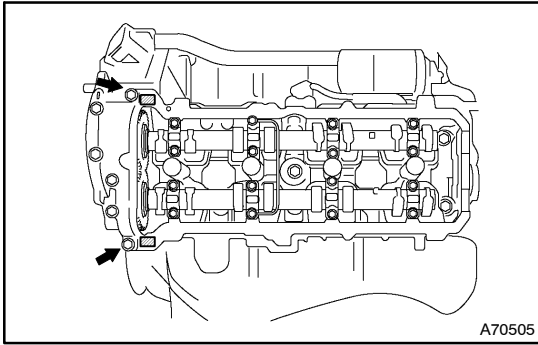
Torque: 7.5 N·m (76 kgf·cm, 66 in·lbf)



15. INSTALL CAMSHAFT TIMING PULLEY SUB-ASSY LH

- (a) Align the camshaft timing tube knock pin with the knock pin groove of the timing pulley.
- (b) Attach the timing pulley to the camshaft timing tube. Face the timing pulley's "L" mark forward.
- (c) Hold the hexagonal portion of the camshaft.
- (d) Using a 5 mm hexagon wrench, install the 4 bolts.

Torque: 8.1 N·m (83 kgf·cm, 72 in·lbf)

**16. INSTALL CYLINDER HEAD COVER**

- (a) Remove any old packing (FIPG) material.
- (b) Apply seal packing to the cylinder heads as shown in the illustration.

Seal packing:**Part No. 08826-00080 or equivalent**

- (c) Install the gasket to the cylinder head cover.
- (d) Install the seal washer to the bolt.
- (e) Install the cylinder head cover with the 18 bolts. Uniformly tighten the bolts in several steps. Install the 2 cylinder head covers.

Torque: 6.0 N·m (60 kgf·cm, 53 in·lbf)**17. INSTALL IGNITION COIL ASSY****Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)****18. INSTALL TIMING BELT (SEE PAGE [14-305](#))**